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C/C



PATENT
143770

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.: 7,116,535

Issued: October 3, 2006

Inventor(s): Huang

Assignee: General Electric Company

For: METHODS AND APPARATUS FOR
PROTECTING AN MR IMAGING
SYSTEM

Certificate
MAR 24 2008
of Correction

CERTIFICATE OF MAILING

I certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on March 17, 2008.

Eric T. Kruschke
Eric T. Kruschke
Reg. No. 42,769

Attention Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION OF
PATENT UNDER 37 C.F.R. 1.322(a)

Sir:

Attached is Form PTO/SB/44 suitable for printing.

Submitted herewith is a copy of the Notice of Allowance and Fee(s) Due and the Notice of Allowability dated May 22, 2006 and a copy of the Amendment filed March 1, 2006. Applicant respectfully submits that the corrections shown below are in accordance with the Amendment filed March 1, 2006. The corrections thereof do not involve such changes in the patent as would constitute new matter or would require re-examination. Applicant respectfully requests a Certificate of Correction for the following:

In Claim 10, column 7, line 24, delete "in a accordance" and insert therefor -- in accordance --.

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In Claim 12, column 7, line 32, between "with" and "dump" insert -- a --.

In Claim 22, column 8, beginning on line 43, delete "diode is parallel said first diode and positioned" and insert therefor -- diode is positioned --.

In Claim 24, column 8, line 55, delete "said RE coil," and insert therefor -- said RF coil, --.

The corrections are not due to any error by Applicant and no fee is due.

The Assignment for this patent is recorded on Reel 015230/Frame 0324.

Respectfully submitted,

Date: March 17, 2008

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UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 7,116,535
APPLICATION NO. : 10/826,643
ISSUE DATE : October 3, 2006
INVENTOR(S) : Huang

PAGE 1 OF 1

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Claim 10, column 7, line 24, delete "in a accordance" and insert therefor -- in accordance --.

In Claim 12, column 7, line 32, between "with" and "dump" insert -- a --.

In Claim 22, column 8, beginning on line 43, delete "diode is parallel said first diode and positioned" and insert therefor -- diode is positioned --.

In Claim 24, column 8, line 55, delete "said RE coil," and insert therefor -- said RF coil, --.

MAILING ADDRESS OF SENDER:

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Atty Dkt. No.: 143770 (12553-397)
Application of: Jinhua Huang
Serial No. 10/826,643
Filed: April 16, 2004
Art Unit: 2836
Examiner: Ronald W. Leja
For: METHODS AND APPARATUS FOR PROTECTING AN MR IMAGING SYSTEM

Enclosed:

Amendment (18 pgs.), in response to Office Action dated 12/1/05
Transmittal Form (3 pgs.), in duplicate
Supplemental Information Disclosure Statement (2 pgs.), along with Attachments FA, FB and OA-OD
Supplemental Information Disclosure Statement Transmittal Form (2 pgs.), in duplicate

ERS/NP/ls
Mailed: March 1, 2006
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Date: 3/31/2006
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SCANNED
By: JML 3/3/06

**COPY****IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Jinhua Huang

Serial No.: 10,826,643

Filed: April 16, 2004

For: METHODS AND APPARATUS FOR
PROTECTING AN MR IMAGING SYSTEM

Art Unit: 2836

Examiner: Leja, Ronald W.

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**TRANSMITTAL**

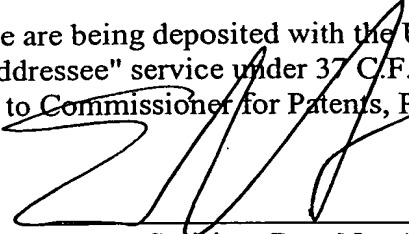
- Transmitted herewith is:
Amendment (18 pgs.), in response to Office Action dated December 1, 2005
Transmittal Form (3 pgs.), in duplicate
Supplemental Information Disclosure Statement (2 pgs.), along with Attachments FA, FB and OA-OD
Supplemental Information Disclosure Statement Transmittal (2 pgs.), in duplicate
Return Post Card

STATUS

- Applicant
☐ claims small entity status.
☒ is other than a small entity.

**CERTIFICATE OF MAILING BY EXPRESS MAIL TO
THE COMMISSIONER FOR PATENTS**Express Mail No. EV770038038US
Date: March 1, 2006

I hereby certify that the documents listed above are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. §1.10 on the date indicated above in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


 Evan R. Sotiriou, Reg. No. 46,247

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EXTENSION OF TERM

3. The proceedings herein are for a patent application and the provisions of 37 C.F.R. 1.136 apply.

(complete (a) or (b), as applicable)

- (a) _____ Applicant petitions for an extension of time under 37 C.F.R. 1.136
(Fees: 37 C.F.R. 1.17(a)-(d) for the total number of months checked below:)

Extension for response within:	Other than small entity Fee	Small entity Fee (if applicable)
_____ first month	\$ 120.00	\$ 60.00
_____ second month	\$ 450.00	\$ 225.00
_____ third month	\$ 1,020.00	\$ 510.00
_____ fourth month	\$1,590.00	\$ 795.00
_____ fifth month	\$2,160.00	\$1,080.00

Fee: \$ _____

If an additional extension of time is required, please consider this a petition therefor.

(Check and complete the next item, if applicable)

_____ An extension of _____ months has already been secured. The fee paid therefor \$ _____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ _____

OR

- (b) X Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

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FEE FOR CLAIMS

4. The fee for claims (37 C.F.R. 1.16(b)-(d)) has been calculated as shown below:

(Col. 1)		(Col. 2)	(Col. 3)	SMALL ENTITY		OTHER THAN SMALL ENTITY
CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	ADDITIONAL RATE FEE	OR	ADDITIONAL RATE FEE
TOTAL INDEP.	MINUS		=	x \$25.00 = \$		x \$50.00 = \$
	MINUS		=	x \$100.00 = \$		x \$200.00 = \$
FIRST PRESENTATION OF MULTIPLE DEP. CLAIM				+ \$180.00 = \$		+ \$360.00 = \$
				TOTAL ADDITIONAL FEE \$	OR	TOTAL ADDITIONAL FEE \$

- (a) ☒ No additional fee for Claims is required

OR

- (b) ☐ Total additional fee for claims required \$ _____

FEE PAYMENT

5. Attached is a check in the sum of \$ _____
- ☐ Charge Deposit Account No. 01-2384 the sum of \$ _____.
A duplicate of this transmittal is attached.

FEE DEFICIENCY

6. ☒ If any additional extension and/or fee is required, charge Deposit Account No. 07-0845.

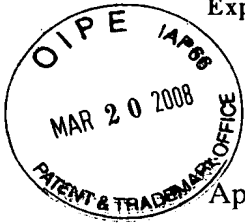
AND/OR

- ☒ If any additional fee for claims is required, charge Deposit Account No. 07-0845.
7. ☐ Other:



Evan R. Sotiriou
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St. Louis, MO 63102
314-621-5070

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Express Mail No. EV770038038US

COPY

143770
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Jinhua Huang

Serial No.: 10,826,643

Filed: April 16, 2004

For: METHODS AND APPARATUS FOR
PROTECTING AN MR IMAGING SYSTEM

:
: Art Unit: 2836
:
: Examiner: Leja, Ronald W.
:
:
:
:

AMENDMENT

Mail Stop: Amendment
Hon. Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the Office Action dated December 1, 2005, please amend the
above identified application as follows.

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IN THE CLAIMS

1. (currently amended) A method of protecting an MR imaging magnet including a plurality of coil groups, said method comprising:

connecting at least one first diode between terminals of a first coil group;

connecting at least one second diode between terminals of a second coil group, wherein the second group is connected to the first coil group via a separation line; and

connecting at least one quench heater ~~between~~with the separation line and with the first and second diodes, wherein a voltage across the first coil group is equal to a sum of voltages across the at least one first diode and the at least one quench heater, and wherein an amount of current flowing through the at least one quench heater is different than an amount of current flowing through the at least one first diode.

2. (original) A method in accordance with Claim 1 wherein said connecting at least one first diode between terminals of a first coil group comprises connecting at least one first diode between terminals of a first coil group, wherein the first coil group comprises at least a portion of a main coil and at least a portion of a shielding coil.

3. (canceled)

4. (currently amended) A method in accordance with ~~Claim 3~~Claim 1 further comprising connecting at least one dump resistor in series with ~~at least one of the first and second diode.~~

5. (currently amended) A method in accordance with Claim 1 further comprising connecting at least one dump resistor in series with ~~at least one of the first and second diode.~~

6. (original) A method in accordance with Claim 5 further comprising connecting at least one shunt resistor in parallel with the quench heater.

7. (original) A method in accordance with Claim 5 further comprising connecting at least one protecting diode in parallel with the quench heater.

8. (original) A method in accordance with Claim 1 further comprising connecting at least one shunt resistor in parallel with the quench heater.

9. (original) A method in accordance with Claim 1 further comprising connecting at least one protecting diode in parallel with the quench heater.

10. (original) A method in accordance with Claim 1, wherein said connecting at least one first diode between terminals of a first coil group comprises connecting at least two first diodes between terminals of the first coil group such that one first diode is positioned with a polarity opposite a polarity of another first diode, wherein said connecting at least one second diode between terminals of a second coil group comprises connecting at least two second diodes between terminals of the second coil group such that one second diode is positioned with a polarity opposite a polarity of another second diode.

11. (currently amended) A method for adjusting energy input to a quench heater, said method comprising:

~~connecting at least one diode in series or parallel with the quench heater and in parallel with at least one coil dump resistor; and~~

~~connecting at least one shunt resistor in series with the diode to adjust energy input to the quench heater, the at least one diode, and the dump resistor in parallel with a coil group of a magnetic resonance imaging system, wherein a voltage across the coil group is equal to a sum of voltages across the quench heater, the at least one diode, and the dump resistor.~~

12. (currently amended) A method for adjusting a current flowing through a coil quench heater, said method comprising:

~~connecting at least one quench heater to a coil separation line separating at least one a first coil group from another coil group such that the quench heater is in parallel to at least one coil group; and a second coil group;~~

connecting at least one shunt resistor or protecting diode in parallel to the
quench heater to adjust the current flowing through the coil quench heater; and

connecting a quench protection diode and the at least one quench heater in parallel with the first coil group, wherein a voltage across the first coil group is equal to a sum of voltages across the quench protection diode and the at least one quench heater, and wherein an amount of current flowing through the at least one quench heater is different than an amount of current flowing through the quench protection diode.

13. (currently amended) A quench protection circuit comprising:

a first coil group;

a second coil group;

a coil separation line connecting said first group to said second group;

a first quench heater connected to said coil separation line; and

~~a first diode in series with said first quench heater such that said first diode and said first quench heater are~~ coupled in parallel at least one of with said first coil group ~~and said second coil group, wherein a voltage across the first coil group is equal to a sum of voltages across the first diode and the first quench heater, and wherein an amount of current flowing through the first quench heater is different than an amount of current flowing through the first diode.~~

14. (currently amended) A circuit in accordance with Claim 13 further comprising a second diode ~~positioned in series~~ coupled with said first quench heater such that said second diode and said quench heater are parallel ~~at least one of said first coil group and to~~ said second coil group, wherein said second diode is parallel with ~~respect to said first diode and~~ positioned with a polarity opposite a polarity of said first diode.

15. (currently amended) A circuit in accordance with Claim 14 further comprising:

a second quench heater connected to said coil separation line, and

a third diode ~~in series with~~ coupled to said second quench heater such that said third diode and said second quench heater are parallel said second coil group, ~~wherein said first diode and said first quench heater are parallel said first coil group.~~

16. (original) A circuit in accordance with Claim 15 further comprising at least one shunt resistor connected to said coil separation line in parallel to said first quench heater and said second quench heater.

17. (original) A circuit in accordance with Claim 16 wherein the first coil group comprises at least a portion of a main coil and at least a portion of a shielding coil.

18. (original) A circuit in accordance with Claim 13 wherein the first coil group comprises at least a portion of a main coil and at least a portion of a shielding coil.

19. (currently amended) A circuit in accordance with Claim 18 further comprising:

a second quench heater connected to said coil separation line, and

a second diode ~~in series~~ coupled with said second quench heater such that said second diode and said second quench heater are parallel said second coil group, ~~wherein said first diode and said first quench heater are parallel said first coil group.~~

20. (currently amended) A circuit in accordance with Claim 13 further comprising:

a second quench heater connected to said coil separation line, and

a second diode ~~in series~~ coupled with said second quench heater such that said second diode and said second quench heater are parallel said second coil group, ~~wherein said first diode and said first quench heater are parallel said first coil group.~~

21. (currently amended) A circuit in accordance with Claim 20 further comprising a third diode ~~positioned in parallel~~ coupled with said second quench heater

such that said third diode and said second quench heater are parallel said second coil group, wherein said second diode is ~~parallel said first diode and~~ positioned with a polarity opposite a polarity of said first diode.

22. (currently amended) A circuit in accordance with Claim 13 further comprising ~~at least one of:~~

~~a shunt resistor positioned in series with the first diode to adjust energy input to the first quench heater, and~~

a shunt resistor positioned in parallel to the first quench heater to adjust the current flowing through the quench heater.

23. (currently amended) A magnetic resonance imaging (MRI) system comprising:

a radio frequency (RF) coil assembly for imaging a subject volume;

a computer coupled to said RF coil, said computer configured to generate images of a scanned object; and

a magnetic resonance imaging magnet having a quench protection circuit, said quench protection system comprising:

a first coil group;

a second coil group;

a coil separation line connecting said first group to said second group;

a first quench heater connected to said coil separation line; and

~~a first diode in series with said first quench heater such that said first diode and said first quench heater are~~ coupled in parallel at least one of with said first coil group ~~and said second coil group, wherein a voltage across the first coil group is equal to a sum of voltages across the first diode and the first quench heater, and wherein an amount of current flowing through the first quench heater is different than an amount of current flowing through the first diode.~~

24. (currently amended) A method of ~~protecting an MR imaging magnet including a plurality of coil groups, said method comprising providing a quench protection circuit configured such that~~ in accordance with Claim 1 wherein the first and second coil groups have a substantial zero eddy current time constant.

25. (currently amended) A method of protecting an MR imaging magnet including a plurality of coil groups including a first coil group and a second coil group, said method comprising ~~providing a quench protection circuit configured such that:~~

connecting a first diode with the first coil group;

connecting the second coil group with the first coil group via a separation line;
and

connecting a quench heater with the separation line and with the first diode, wherein a voltage across the first coil group is equal to a sum of voltages across the first diode and the quench heater, and wherein an amount of current flowing through the quench heater is different than an amount of current flowing through the first diode, and wherein the first and second coil groups have substantially no unbalanced quench forces during quench events.

26. (currently amended) A method of ~~protecting an MR imaging magnet including a plurality of coil groups, said method comprising providing a quench protection circuit configured such that~~ in accordance with Claim 1 wherein the first and second coil groups have substantially small fringe field blooming during quench events.

Remarks

The Office Action mailed December 1, 2005 has been carefully reviewed and the following remarks have been made in consequence thereof.

Claims 1, 2, and 4-26 are now pending in this application. Claims 1-26 are rejected. Claim 3 is canceled without prejudice, waiver, or disclaimer. Claims 1, 4, 5, 11-15, and 19-26 have been amended. No new matter has been added.

The rejection of Claims 1-11, 21, and 22 under 35 U.S.C §112, second paragraph, is respectfully traversed. Claim 3 has been canceled. Applicant has amended Claims 1, 4, 5, 11, 21, and 22. Claims 2 and 6-10 depend, directly or indirectly, from independent Claim 1. Accordingly, Applicant respectfully submits that Claims 1-11, 21, and 22 particularly point out and distinctly claim the subject matter which the Applicant regards as his invention. Hence, Applicant respectfully requests that the section 112 rejection to Claims 1-11, 21, and 22 be withdrawn.

The rejection of Claims 1-3, 8-15, 18-22, and 24-26 under 35 U.S.C. § 102(b) as being anticipated by Huang et al. (U.S. Patent No. 6,147,844) is respectfully traversed.

Huang et al. describe a quench protection circuit for persistent superconducting magnets for magnetic resonance imaging. The quench protection circuit includes a series of connected magnet coils (16 and 17) that are shunted by a plurality of heaters (31, 32, 33 and 34) with a plurality of diodes (35 and 36) connected in parallel in a reverse polarity connection with an emitter of each connected to a collector of the other (column 3, lines 26-30, Figure 2). A reverse polarity diode circuit (137) includes a plurality of diodes (138 and 139) connected in series with parallel heater circuit (31, 32, 33, 34) and across the magnet coils (column 4, lines 54-56, Figure 3).

Claim 1 recites a method of protecting an MR imaging magnet including a plurality of coil groups, the method comprising "connecting at least one first diode between terminals of a first coil group; connecting at least one second diode between terminals of a second coil group, wherein the second group is connected to the first coil group via a separation line; and connecting at least one quench heater with the

separation line and with the first and second diodes, wherein a voltage across the first coil group is equal to a sum of voltages across the at least one first diode and the at least one quench heater, and wherein an amount of current flowing through the at least one quench heater is different than an amount of current flowing through the at least one first diode.”

Huang et al. do not describe or suggest a method of protecting an MR imaging magnet as recited in Claim 1. Specifically, Huang et al. do not describe or suggest a voltage across the first coil group is equal to a sum of voltages across the at least one first diode and the at least one quench heater, and where an amount of current flowing through the at least one quench heater is different than an amount of current flowing through the at least one first diode. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Accordingly, for the reasons set forth above, Claim 1 is submitted to be patentable over Huang et al.

Claim 3 has been canceled. Claims 2, 8-10, 24, and 26 depend from independent Claim 1. When the recitations of Claims 2, 8-10, 24, and 26 are considered in combination with the recitations of Claim 1, Applicant submits that Claims 2, 8-10, 24, and 26 likewise are patentable over Huang et al.

Claim 11 recites a method for adjusting energy input to a quench heater, the method comprising “connecting at least one diode in series with a dump resistor; and connecting a quench heater, the at least one diode, and the dump resistor in parallel with a coil group of a magnetic resonance imaging system, wherein a voltage across the coil group is equal to a sum of voltages across the quench heater, the at least one diode, and the dump resistor.”

Huang et al. do not describe or suggest a method for adjusting energy input to a quench heater as recited in Claim 11. Specifically, Huang et al. do not describe or

suggest connecting a quench heater, at least one diode, and a dump resistor in parallel with a coil group of a magnetic resonance imaging system, where a voltage across the coil group is equal to a sum of voltages across the quench heater, the at least one diode, and the dump resistor, and where the at least one diode is in series with the dump resistor. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Accordingly, for the reasons set forth above, Claim 11 is submitted to be patentable over Huang et al.

Claim 12 recites a method for adjusting a current flowing through a coil quench heater, the method comprising "connecting at least one quench heater to a coil separation line separating a first coil group from a second coil group; connecting at least one shunt resistor or protecting diode in parallel to the quench heater to adjust the current flowing through the coil quench heater; and connecting a quench protection diode and the at least one quench heater in parallel with the first coil group, wherein a voltage across the first coil group is equal to a sum of voltages across the quench protection diode and the at least one quench heater, and wherein an amount of current flowing through the at least one quench heater is different than an amount of current flowing through the quench protection diode."

Huang et al. do not describe or suggest a method for adjusting a current flowing through a coil quench heater as recited in Claim 12. Specifically, Huang et al. do not describe or suggest connecting a quench protection diode and the at least one quench heater in parallel with the first coil group, where a voltage across the first coil group is equal to a sum of voltages across the quench protection diode and the at least one quench heater, and where an amount of current flowing through the at least one quench heater is different than an amount of current flowing through the quench protection diode. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a

plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Accordingly, for the reasons set forth above, Claim 12 is submitted to be patentable over Huang et al.

Claim 13 recites a quench protection circuit comprising “a first coil group; a second coil group; a coil separation line connecting said first group to said second group; a first quench heater connected to said coil separation line; and a first diode and said first quench heater are coupled in parallel with said first coil group, wherein a voltage across the first coil group is equal to a sum of voltages across the first diode and the first quench heater, and wherein an amount of current flowing through the first quench heater is different than an amount of current flowing through the first diode.”

Huang et al. do not describe or suggest a quench protection circuit as recited in Claim 13. Specifically, Huang et al. do not describe or suggest a first diode and the first quench heater are coupled in parallel with the first coil group, where a voltage across the first coil group is equal to a sum of voltages across the first diode and the first quench heater, and where an amount of current flowing through the first quench heater is different than an amount of current flowing through the first diode. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Accordingly, for the reasons set forth above, Claim 13 is submitted to be patentable over Huang et al.

Claims 14, 15, and 18-22 depend, directly or indirectly, from independent Claim 13. When the recitations of Claims 14, 15, and 18-22 are considered in

combination with the recitations of Claim 13, Applicant submits that Claims 14, 15, and 18-22 likewise are patentable over Huang et al.

Claim 25 recites a method of protecting an MR imaging magnet including a plurality of coil groups including a first coil group and a second coil group, said method comprising “connecting a first diode with the first coil group; connecting the second coil group with the first coil group via a separation line; and connecting a quench heater with the separation line and with the first diode, wherein a voltage across the first coil group is equal to a sum of voltages across the first diode and the quench heater, and wherein an amount of current flowing through the quench heater is different than an amount of current flowing through the first diode, and wherein the first and second coil groups have substantially no unbalanced quench forces during quench events.”

Huang et al. do not describe or suggest a method of protecting an MR imaging magnet as recited in Claim 25. Specifically, Huang et al. do not describe or suggest a voltage across the first coil group is equal to a sum of voltages across the first diode and the quench heater, and where an amount of current flowing through the quench heater is different than an amount of current flowing through the first diode. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Accordingly, for the reasons set forth above, Claim 25 is submitted to be patentable over Huang et al.

For at least the reasons set forth above, Applicant respectfully requests that the Section 102 rejection of Claims 1-3, 8-15, 18-22, and 24-26 be withdrawn.

The rejection of Claim 23 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. is respectfully traversed.

Huang et al. is described above.

Claim 23 recites a magnetic resonance imaging (MRI) system comprising “a radio frequency (RF) coil assembly for imaging a subject volume; a computer coupled to said RF coil, said computer configured to generate images of a scanned object; and a magnetic resonance imaging magnet having a quench protection circuit, said quench protection system comprising: a first coil group; a second coil group; a coil separation line connecting said first group to said second group; a first quench heater connected to said coil separation line; and a first diode and said first quench heater are coupled in parallel with said first coil group, wherein a voltage across the first coil group is equal to a sum of voltages across the first diode and the first quench heater, and wherein an amount of current flowing through the first quench heater is different than an amount of current flowing through the first diode.”

Huang et al. do not describe or suggest a magnetic resonance imaging (MRI) system as recited in Claim 23. Specifically, Huang et al. do not describe or suggest a first diode and the first quench heater are coupled in parallel with the first coil group, where a voltage across the first coil group is equal to a sum of voltages across the first diode and the first quench heater, and where an amount of current flowing through the first quench heater is different than an amount of current flowing through the first diode. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Accordingly, for the reasons set forth above, Claim 23 is submitted to be patentable over Huang et al.

In addition to the arguments set forth above, Applicant respectfully submits that the Section 103 rejection of Claim 23 over Huang et al. alone is not a proper rejection. As is well established, the mere assertion that it would have been obvious to one of ordinary skill in the art to have modified Huang et al. to obtain the claimed recitations of the present invention does not support a prima facie obvious rejection. Rather, each allegation of what would have been an obvious matter of design choice must always be supported by citation to some reference work recognized as standard

in the pertinent art and the Applicant given the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference. Applicant has not been provided with the citation to any reference supporting the combination made in the rejection. The rejection, therefore, fails to provide the Applicant with a fair opportunity to respond to the rejection, and fails to provide the Applicant with the opportunity to challenge the correctness of the rejection. Of course, such combinations are impermissible, and for this reason alone, Applicant requests that the Section 103 rejection of Claim 23 be withdrawn.

For at least the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claim 23 be withdrawn.

The rejection of Claims 4-7, 16, and 17 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. and further in view of Gross et al. (U.S. Patent 5,650,902) is respectfully traversed.

Huang et al. is described above.

Gross et al. describe a superconducting-magnet electrical circuit (12) (Figure 3). The superconducting-magnet electrical circuit includes a bipolar current-bypass electrical-circuit element (16). The bipolar current-bypass electrical-circuit element includes first and second diodes (46 and 48) opposingly coupled together in parallel (column 4, lines 40-44). The superconductive-magnet electrical circuit also contains a voltage-clamping device (54) (column 5, lines 27-28). The voltage-clamping device includes a resistor (56) having a first lead (58) and a second lead (60), where the first lead is coupled in parallel with second and third superconductive-coil portions (20 and 22) (column 5, lines 28-32).

Claims 4-7 depend, directly or indirectly, from independent Claim 1 which is recited above. Neither Huang et al. nor Gross et al., considered alone or in combination, describe or suggest a method of protecting an MR imaging magnet as recited in Claim 1. Specifically, neither Huang et al. nor Gross et al., considered alone or in combination, describe or suggest a voltage across the first coil group is equal to a sum of voltages across the at least one first diode and the at least one quench heater, and where an amount of current flowing through the at least one

quench heater is different than an amount of current flowing through the at least one first diode. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Gross et al. describe a superconducting-magnet electrical circuit that includes a bipolar current-bypass electrical-circuit element. The bipolar current-bypass electrical-circuit element includes first and second diodes opposingly coupled together in parallel. The superconductive-magnet electrical circuit also contains a voltage-clamping device. The voltage-clamping device includes a resistor having a first lead and a second lead, where the first lead is coupled in parallel with second and third superconductive-coil portions. The superconducting-magnet electrical circuit is shown in Figure 3 of Gross et al. Accordingly, for the reasons set forth above, Claim 1 is submitted to be patentable over Huang et al. in view of Gross et al.

When the recitations of Claims 4-7 are considered in combination with the recitations of Claim 1, Applicant submits that dependent Claims 4-7 likewise are patentable over Huang et al. in view of Gross et al.

Claims 16 and 17 depend, directly or indirectly, from independent Claim 13 which is recited above. Neither Huang et al. nor Gross et al., considered alone or in combination, describe or suggest a quench protection circuit as recited in Claim 13. Specifically, neither Huang et al. nor Gross et al., considered alone or in combination, describe or suggest a first diode and the first quench heater are coupled in parallel with the first coil group, where a voltage across the first coil group is equal to a sum of voltages across the first diode and the first quench heater, and where an amount of current flowing through the first quench heater is different than an amount of current flowing through the first diode. Rather, Huang et al. describe an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. The MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters

with a plurality of diodes connected in parallel is shown in Figure 2 of Huang et al. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils as shown in Figure 3 of Huang et al. Gross et al. describe a superconducting-magnet electrical circuit that includes a bipolar current-bypass electrical-circuit element. The bipolar current-bypass electrical-circuit element includes first and second diodes opposingly coupled together in parallel. The superconductive-magnet electrical circuit also contains a voltage-clamping device. The voltage-clamping device includes a resistor having a first lead and a second lead, where the first lead is coupled in parallel with second and third superconductive-coil portions. The superconducting-magnet electrical circuit is shown in Figure 3 of Gross et al. Accordingly, for the reasons set forth above, Claim 13 is submitted to be patentable over Huang et al. in view of Gross et al.

When the recitations of Claims 16 and 17 are considered in combination with the recitations of Claim 13, Applicant submits that dependent Claims 16 and 17 likewise are patentable over Huang et al. in view of Gross et al.

For at least the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claims 4-7, 16, and 17 be withdrawn.

Moreover, Applicant respectfully submits that the Section 103 rejection of Claims 4-7, 16, and 17 is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Huang et al. nor Gross et al., considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Huang et al. with Gross et al. because there is no motivation to combine the references suggested in the cited art itself.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicant's disclosure, in the prior

art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Huang et al. teach an MRI protection circuit including a series of connected magnet coils that are shunted by a plurality of heaters with a plurality of diodes connected in parallel. A reverse polarity diode circuit includes a plurality of diodes connected in series with the heaters and across the magnet coils. Gross et al. teach a superconducting-magnet electrical circuit that includes a bipolar current-bypass electrical-circuit element. The bipolar current-bypass electrical-circuit element includes first and second diodes opposingly coupled together in parallel. The superconductive-magnet electrical circuit also contains a voltage-clamping device. The voltage-clamping device includes a resistor having a first lead and a second lead, where the first lead is coupled in parallel with second and third superconductive-coil portions. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejections of Claims 4-7, 16, and 17 be withdrawn.

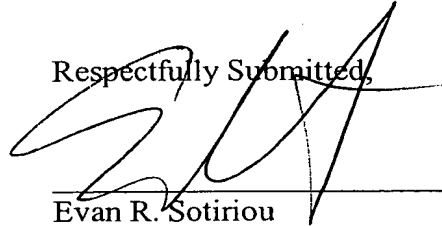
For at least the reasons set forth above, Applicant respectfully requests that the rejections of Claims 4-7, 16, and 17 under 35 U.S.C. 103(a) be withdrawn.

COPY

143770
PATENT

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



Evan R. Sotiriou
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UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

7590

05/22/2006

John S. Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St. Louis, MO 63102

EXAMINER

LEJA, RONALD W

ART UNIT

PAPER NUMBER

2836

DATE MAILED: 05/22/2006

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,643	04/16/2004	Jinhua Huang	143770	2293

TITLE OF INVENTION: METHODS AND APPARATUS FOR PROTECTING AN MR IMAGING SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	08/22/2006

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

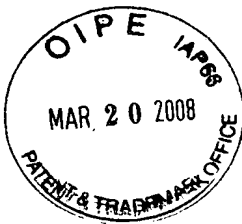
Entered into PAGE/PIPS

Date 5-30-06

Page 1 of 3

By: M.H. 5/30/06

ENTERED
Date: 5/26/06
By: KRG
12553-3917



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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or **Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590

05/22/2006

John S. Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St. Louis, MO 63102

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

	(Depositor's name)
	(Signature)
	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,643	04/16/2004	Jinhua Huang	143770	2293

TITLE OF INVENTION: METHODS AND APPARATUS FOR PROTECTING AN MR IMAGING SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	08/22/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEJA, RONALD W	2836	361-019000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1	_____
2	_____
3	_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.111. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,643	04/16/2004	Jinhua Huang	143770	2293
7590	05/22/2006			

John S. Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St. Louis, MO 63102

EXAMINER	
LEJA, RONALD W	

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 05/22/2006

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 168 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 168 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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Notice of Allowability

Application No.

10/826,643

Examiner

Ronald W. Leja

Applicant(s)

HUANG, JINHUA

Art Unit

2836

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment of 3/1/2006.
2. ☒ The allowed claim(s) is/are 1, 2 and 4-26.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 3/1/2006
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 5/10/2006.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Ronald W. Leja
Ronald W. Leja
Primary Examiner
Art Unit 2836

5/10/08 MAR 24 2008

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Application/Control Number: 10/826,643

Page 2

Art Unit: 2836

An Examiner's Amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the Issue Fee.

IN THE CLAIMS:

Claim 1, line 6, after "heater" insert -- directly -- and in line 7, before "equal" insert -- at least --.

Claim 12, line 3, after "heater" insert -- directly --.

Claim 13, line 5, after "heater" insert -- directly --.

Claim 23, line 11, after "heater" insert -- directly --.

Claim 25, line 8, after "heater" insert -- directly --.

Authorization for this Examiner's Amendment was given in a telephone interview with Mr. Nish on 5/10/2006.

The following is an Examiner's Statement of Reasons for Allowance: The changes above were deemed necessary to further distinguish the instant claim language from the Prior Art of Record. Having the quench heater(s) directly connected with the separation line, as found throughout Applicant's Figures, in combination with the remaining limitations found within the Independent Claims 1, 12, 13, 23 and 25 is not disclosed by the Prior Art of Record. Claim 11 requires the series connection of a dump resistor, diode and quench heater to be in parallel with a coil group. Gross et al. (5,650,903) does teach the heater in direct connection with a separation line, but there is no motivation, except hindsight, for modifying the Reference so as to make obvious the other limitations within the combination. There does not appear to be

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Application/Control Number: 10/826,643

Page 3

Art Unit: 2836

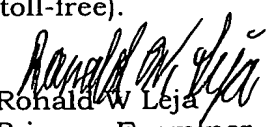
strong motivation for modifying any of the References so as to make obvious the claimed combinations.

Any comments considered necessary by Applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald W. Leja whose telephone number is (571)272-2053. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571)272-2800. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

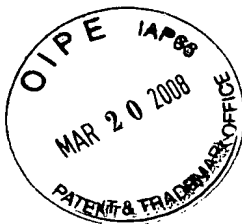

Ronald W. Leja
Primary Examiner
Art Unit 2836

5/10/06

rwl
May 10, 2006

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Interview Summary	Application No.	Applicant(s)	
	10/826,643	HUANG, JINHUA	
	Examiner	Art Unit	
	Ronald W. Leja	2836	

All participants (applicant, applicant's representative, PTO personnel):

(1) Ronald W. Leja. (3) _____

(2) Mr. Nish. (4) _____

Date of Interview: 10 May 2006.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.
If Yes, brief description: _____

Claim(s) discussed: 1, 12, 13, 23 and 25.

Identification of prior art discussed: Gross et al. (5,650,903); EP 0758811 A2; Huang et al. (6,147,844).

Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Add some claim language to Independent Claims 1, 12, 13, 23 and 25 so as to further distinguish the claims from the Prior Art of Record.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

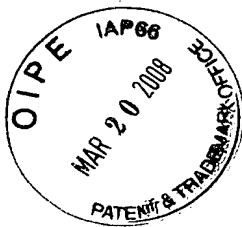
THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

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Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Ronald W. Leja 5/10/06
Examiner's signature, if required



COPY

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

MAR 24 2008



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Substitute for form 1449/PTO

(Use as many sheets as necessary)

Sheet	1	of	2
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Complete if Known

Application Number	10/826,643
Filing Date	April 16, 2004
First Named Inventor	Jinhua Huang
Art Unit	2836
Examiner Name	Ronald W. Leja
Attorney Docket Number	143770

U. S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T
		Country Code* Number * Kind Code* (if known)				
RWE	FA	EP0489291 A3	06/10/1992	Westinghouse Electric Corp.		
	FB	EP0758811 A3	02/19/1997	General Electric Company		

Examiner Signature	<i>Ronald W. King</i>	Date Considered	<i>5/12/05</i>
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

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Complete if Known

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Application Number	10/826,643
Filing Date	April 16, 2004
First Named Inventor	Jinhua Huang
Art Unit	2836
Examiner Name	Ronald W. Leja
Attorney Docket Number	143770

Sheet 2 of 2

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
RV	OA	English Translation of a portion of Japanese Patent JP04125021 A2, 04/24/1992	
RV	OB	Great Britain Search Report, 9FEB2006, 1 pg.	
RV	OC	Great Britain Search Report, 26SEP2005, 1 pg.	
RV	OD	R.E. SCHWALL, Protection System For Inductively Coupled Magnets, Transactions On Magnetism, V. 27, No. 2, March 1991, pp. 1700-1703	

Examiner Signature

Ronald W. Leja

Date Considered

5/10/06

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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